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2021-05-Asia



Math Test – No Calculator

25 MINUTES, 20 QUESTIONS

Turn to Section 3 of your answer sheet to answer the questions in this section.

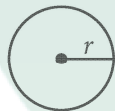
DIRECTIONS

For questions 1-15, solve each problem, choose the best answer from the choices provided, and fill in the corresponding bubble on your answer sheet. For questions 16-20, solve the problem and enter your answer in the grid on the answer sheet. Please refer to the directions before question 16 on how to enter your answers in the grid. You may use any available space in your test booklet for scratch work.

NOTES

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4. All figures lie in a plane unless otherwise indicated.
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REFERENCE

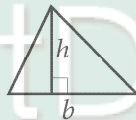


$$A = \pi r^2$$

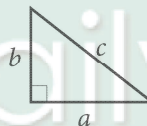
$$C = 2\pi r$$



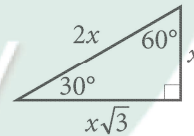
$$A = \ell w$$



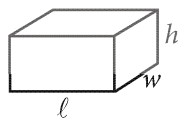
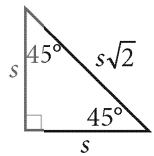
$$A = \frac{1}{2}bh$$



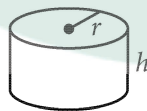
$$c^2 = a^2 + b^2$$



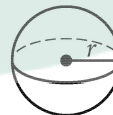
Special Right Triangles



$$V = \ell wh$$



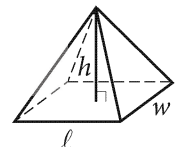
$$V = \pi r^2 h$$



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



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



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

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

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

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



1

A college mathematics department plans to spend \$1,800 buying computers and books. Each computer costs \$300 and each book costs \$90. Which equation represents this situation, where x is the number of computers and y is the number of books that the department can buy?

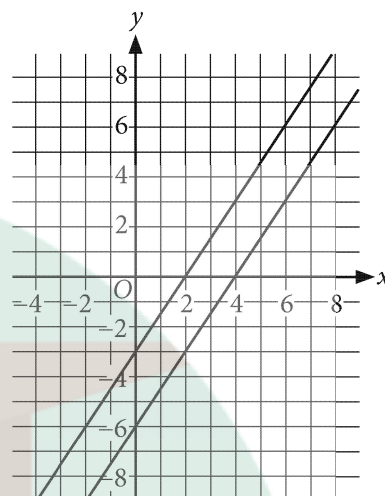
- A) $300x + 90y = 1,800$
- B) $90x + 300y = 1,800$
- C) $390(x + y) = 1,800$
- D) $1,800(x + y) = 390$

2

What is the x -intercept of the graph of $8x + 6y = 24$ in the xy -plane?

- A) (3, 0)
- B) (4, 0)
- C) (6, 0)
- D) (8, 0)

3



What system of linear equations is represented by the lines shown?

- A) $3x - 2y = 6$
 $3x - 2y = 12$
- B) $3x - 2y = 6$
 $3x + 2y = 12$
- C) $2x + 3y = 6$
 $2x - 3y = 12$
- D) $-2x - 3y = 6$
 $-2x + 3y = 12$

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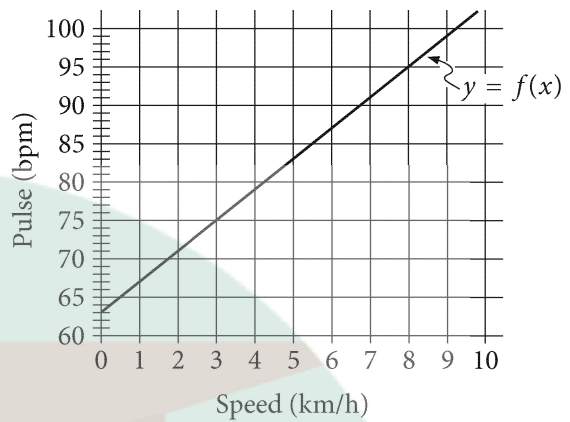
4

$$ka + nb = 10$$

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

- A) $a = 10 - \frac{k}{nb}$
- B) $a = 10 - \frac{nb}{k}$
- C) $a = \frac{10 - k}{nb}$
- D) $a = \frac{10 - nb}{k}$

5

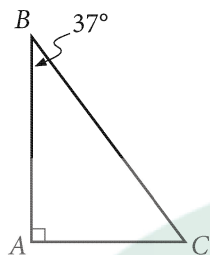


The function f models Jack's pulse, in beats per minute (bpm), as a function of his speed, in kilometers per hour (km/h), on a stationary bicycle. Based on the model, what was Jack's pulse, in bpm, when his speed was 0 km/h?

- A) 4
- B) 15
- C) 63
- D) 123

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6



Triangle DEF (not shown) is similar to triangle ABC above, where side DE corresponds to side AB , side DF corresponds to side AC , and $DE = 2AB$. What is the measure of angle DFE ?

- A) 37°
- B) 53°
- C) 74°
- D) 106°

7

Which expression is equivalent to $x^4 - 18x^2 + 81$?

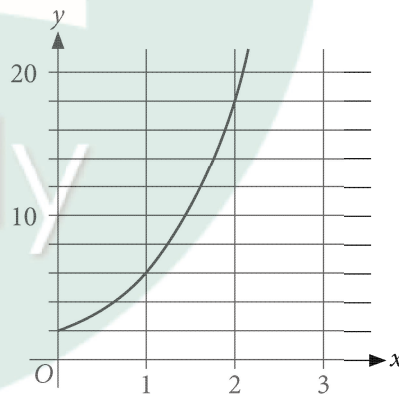
- A) $(x - 3)^4$
- B) $(x - 3)(x + 3)^3$
- C) $(x - 3)^3(x + 3)$
- D) $(x - 3)^2(x + 3)^2$

8

Which expression is equivalent to $g^{\frac{4}{5}}h^{\frac{2}{5}}$, where g and h are positive?

- A) $\sqrt[4]{g^5h^{10}}$
- B) $\sqrt[5]{g^4h^2}$
- C) $\frac{1}{\sqrt[4]{g^5h^{10}}}$
- D) $\frac{1}{\sqrt[5]{g^4h^2}}$

9



What is an equation of the graph shown?

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



10

$$|x + 2| = |x - 8|$$

What is the solution to the given equation?

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

11

$$y = (x + 5)^2 - 8$$

The equation above can be represented by a parabola in the xy -plane. The parabola is then translated so that the vertex is at $(0, 0)$. Which of the following best describes the translation?

- A) 5 units in the negative x direction and 8 units in the negative y direction
- B) 5 units in the negative x direction and 8 units in the positive y direction
- C) 5 units in the positive x direction and 8 units in the negative y direction
- D) 5 units in the positive x direction and 8 units in the positive y direction

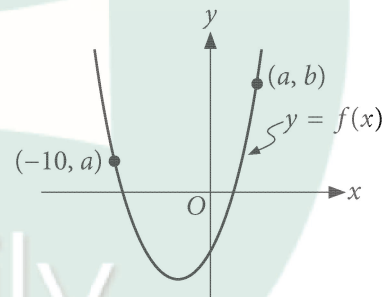
12

$$5x - 2 + 3x = 3(x + 4) + 5x - 10$$

Which of the following statements is true about the equation above?

- A) The equation has one solution because a single value of x makes this equation true.
- B) The equation has one solution because the equation is true for all values of x .
- C) The equation has an infinite number of solutions because the equation is true for all values of x .
- D) The equation has no solution because the equation is not true for any value of x .

13



The graph of the function f defined by

$$f(x) = \frac{1}{4}(x + 4)^2 - 5$$
 is shown. The graph passes

through the points $(-10, a)$ and (a, b) , where a and b are constants. What is the value of b ?

- A) 4
- B) 9
- C) 11
- D) 16



14

$$x^2 - 12x + 23 = 0$$

Which of the following is a solution to the given equation?

- A) $-12 + \sqrt{11}$
- B) $12 + \sqrt{11}$
- C) $-6 + \sqrt{13}$
- D) $6 + \sqrt{13}$

15

In the xy -plane, the points $(-3, 10)$ and $(3, 10)$ are endpoints of the diameter of a circle. Which equation represents this circle?

- A) $x^2 + (y - 10)^2 = 9$
- B) $(x + 3)^2 + y^2 = 36$
- C) $(x + 3)^2 + (y - 10)^2 = 9$
- D) $(x + 3)^2 + (y - 10)^2 = 36$




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DIRECTIONS

For questions 16-20, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the bubbles accurately. You will receive credit only if the bubbles are filled in correctly.
- Mark no more than one bubble in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.

- Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or $7/2$. (If  is entered into the

grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)

- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer: $\frac{7}{12}$ are:

Write answer in boxes. →

7	/	1	2
0	0	0	
1	1		1
2	2	2	
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
	7	7	7
8	8	8	8
9	9	9	9

← Fraction line

Grid in result.

Answer: 2.5

	2	.	5
0	0	0	
1	1	1	1
2		2	2
3	3	3	3
4	4	4	4
5	5	5	
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Decimal point

Acceptable ways to grid $\frac{2}{3}$ are:

	2	/	3
0	0	0	
1	1	1	1
2		2	2
3	3	3	
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

.	6	6	6
0	0	0	
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6			
7	7	7	7
8	8	8	8
9	9	9	9

.	6	6	7
0	0	0	
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6			
7	7	7	
8	8	8	8
9	9	9	9

Answer: 201 – either position is correct

	2	0	1
0			0
1	1	1	
2		2	2
3	3	3	3

2	0	1	
		0	0
1	1		1
	2	2	2
3	3	3	3

NOTE:

You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



16

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

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

19

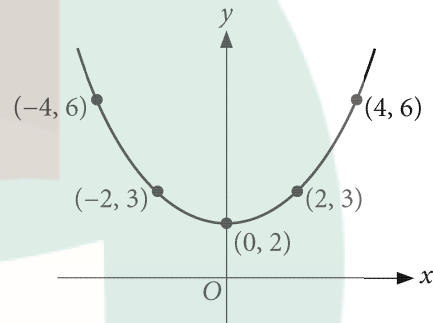
An office building has a room with a square-shaped floor. The actual length of the floor is 90 times the length of the floor on a blueprint drawn to scale. The actual area of the floor is p times the area of the floor on the blueprint. What is the value of p ?

17

$$9n + 3 = 15n$$

What value of n satisfies the given equation?

20



18

The function f is defined by $f(x) = \frac{2}{5}x + 10$. For what value of x does $f(x) = 30$?

The graph of $y = ax^2 + c$, where a and c are constants, is shown. What is the value of a ?

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STOP

**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.**



Math Test – Calculator

55 MINUTES, 38 QUESTIONS

Turn to Section 4 of your answer sheet to answer the questions in this section.

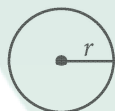
DIRECTIONS

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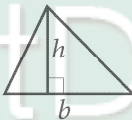


$$A = \pi r^2$$

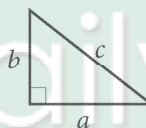
$$C = 2\pi r$$



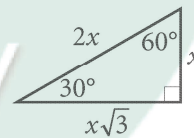
$$A = \ell w$$



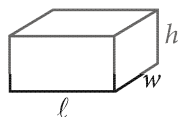
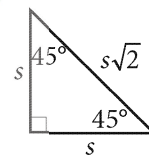
$$A = \frac{1}{2}bh$$



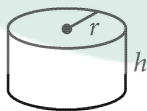
$$c^2 = a^2 + b^2$$



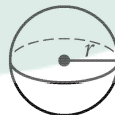
Special Right Triangles



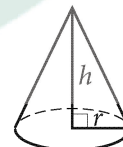
$$V = \ell wh$$



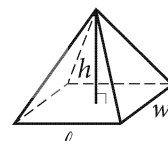
$$V = \pi r^2 h$$



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



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



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

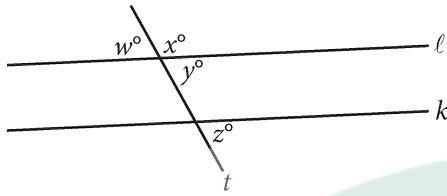
The number of degrees of arc in a circle is 360.

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.



1



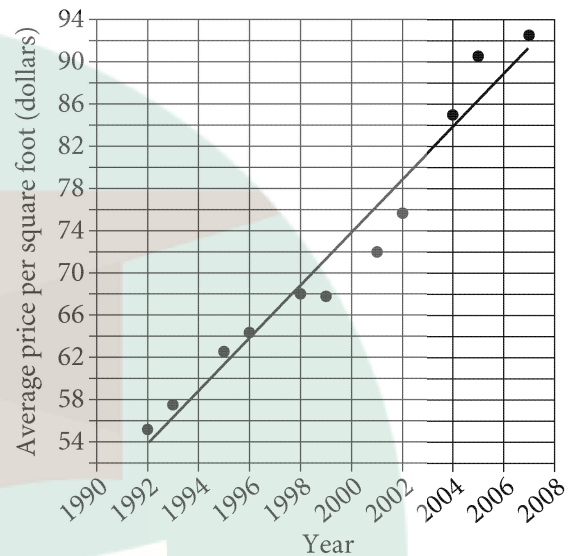
Note: Figure not drawn to scale.

In the figure shown, line t intersects lines ℓ and k . Which additional piece of information is sufficient to prove that lines ℓ and k are parallel?

- A) $x > 90$
- B) $w < 90$
- C) $w = y$
- D) $y = z$

2

The scatterplot shows the average price per square foot of a house in the United States each year for several years. A line of best fit for the data is also shown.



The line of best fit predicted that the average price per square foot in 2001 would be \$76. What is the difference between the predicted value and the actual average price per square foot in 2001?

- A) \$0
- B) \$2
- C) \$4
- D) \$6

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3

$$(x - 8)^3 = 0$$

What is the solution to the given equation?

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

Questions 4 and 5 refer to the following information.

Costs of some steps to publish a manuscript can vary, as shown in the table.

Publishing step	Minimum cost per manuscript	Maximum cost per manuscript	Mean cost per manuscript
Acquiring an ISBN	\$125	\$125	\$125
Professional review	\$250	\$650	\$395
Marketing	\$35 per hour	\$75 per hour	\$50 per hour

4

Ewan writes 30 manuscripts and wants to get them published. What is the minimum cost, in dollars, for professional review of Ewan's manuscripts?

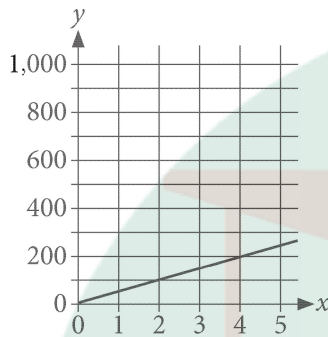
- A) \$7,500
- B) \$11,850
- C) \$13,125
- D) \$18,750



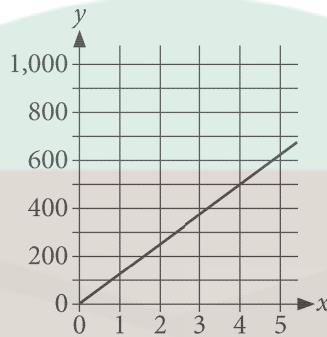
5

Which of the following graphs could represent the relationship between the number of manuscripts, x , and the cost, y , of acquiring ISBNs for the manuscripts?

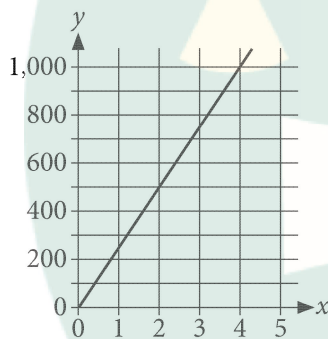
A)



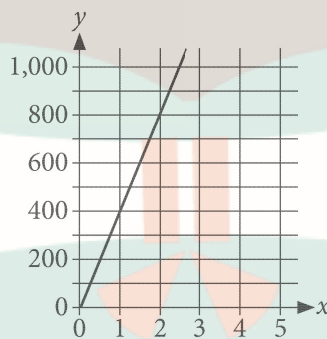
B)



C)



D)



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6

Water quality managers estimate that a population of algae initially covered x square miles of water in a nearby river. After a period of time, the algae grew to cover 375% of its original area. Which of the following expressions represents the area of water, in square miles, that the algae covered after this period of time?

- A) $0.375x$
- B) $3.75x$
- C) $37.5x$
- D) $375x$

Questions 7 and 8 refer to the following information.

The nutrition information for a chicken noodle soup recipe is shown in the table. One batch of soup consists of 6 servings. (1 serving = 1 cup)

Nutrition Information, Amount/Serving
Total calories: 203 calories
Percent of total calories from fat: 30%
Fat: 7 grams
Protein: 25 grams
Carbohydrate: 9 grams
Fiber: 1 gram

7

Approximately how many calories from fat are in one serving of the soup?

- A) 61
- B) 75
- C) 144
- D) 609

8

The total cost to make one batch of soup is \$20. What is the approximate cost per calorie, in cents?

- A) 1.6
- B) 9.9
- C) 33.8
- D) 59.1

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9

$$(x + 1) = 2(x + 1)$$

What value of x satisfies the given equation?

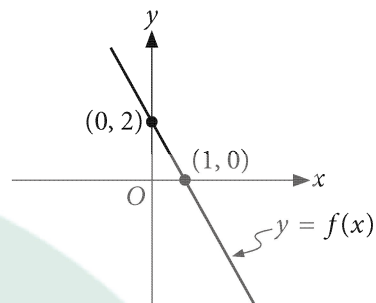
- A) -1
- B) 0
- C) $\frac{1}{2}$
- D) 1

10

In the xy -plane, what is the y -intercept of the line with equation $y = -2x + 4$?

- A) $(4, 0)$
- B) $(2, 0)$
- C) $(0, 2)$
- D) $(0, 4)$

11



The graph of the linear function f is shown. Which equation defines f ?

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

12

A speed of 60 meters per second is equivalent to z meters per minute. What is the value of z ?

- A) 1
- B) 600
- C) $1,200$
- D) $3,600$

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13

$$E = 18,000 - 2,000t$$

$$V = 18,000(0.85)^t$$

The given equations are two different models that can be used to find the value, in dollars, of a particular car t years after it was purchased. Which of the following statements correctly compares the values of E and V for $0 < t < 9$?

- A) E is always less than V .
- B) E is always greater than V .
- C) E is initially greater than V but eventually becomes less than V .
- D) E is initially less than V but eventually becomes greater than V .

14

	Type A	Type B	Type C	Total
Category 1	10	8	14	32
Category 2	12	7	15	34
Category 3	10	5	19	34
Total	32	20	48	100

The table shown summarizes 100 items by type and category. One type C item will be selected at random. What is the probability that the selected item will be in category 3?

- A) $\frac{19}{100}$
- B) $\frac{19}{48}$
- C) $\frac{19}{34}$
- D) $\frac{34}{48}$

15

Henri buys 2 boxes of blue pens and some boxes of black pens. Each box contains 10 pens, and Henri buys a total of 50 pens. The equation $10(x + 2) = 50$ represents this situation. Which of the following is the best interpretation of the expression $x + 2$ in this context?

- A) The number of blue pens that Henri buys
- B) The number of boxes of pens that Henri buys
- C) The number of boxes of blue pens that Henri buys
- D) The number of boxes of black pens that Henri buys



16

For the linear function f , $f(6) = 4$, and the graph of $y = f(x)$ in the xy -plane has a slope of $\frac{1}{2}$. Which equation defines f ?

- A) $f(x) = \frac{1}{2}x + 1$
- B) $f(x) = \frac{1}{2}x + 2$
- C) $f(x) = \frac{1}{2}x + 4$
- D) $f(x) = \frac{1}{2}x + 10$

17

Crawford County, Iowa, is shaped like a rectangle. The length of the county is 6 miles longer than the width of the county. If $A(x)$ is the area of the county, in square miles, and x is the width, in miles, which equation best models the area of the county?

- A) $A(x) = x(6x)$
- B) $A(x) = x(6 - x)$
- C) $A(x) = x(x - 6)$
- D) $A(x) = x(x + 6)$

18

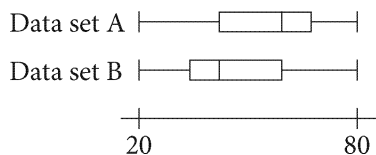
$$|x + 3| = 0$$

Exactly how many solutions does the given equation have?

- A) Zero
- B) One
- C) Two
- D) Three



19



The box plots above show the distributions of two data sets. Which of the following statements must be true?

- A) The minimum value of numbers in data set A is greater than the minimum value of numbers in data set B.
- B) The range of data set A is greater than the range of data set B.
- C) Data set A has more data values than data set B has.
- D) The median of data set A is greater than the median of data set B.

20

In a tournament for 64 teams, each game is played between two teams. Each team plays one game in the first round. For all rounds, the winning team of each game advances to play a game in the next round, and the losing team is eliminated from the tournament. How many teams remain to play in the fourth round of the tournament?

- A) 4
- B) 8
- C) 16
- D) 32

21

For a certain type of aircraft, the ratio of thrust, in newtons, to weight, in newtons, is 27 to 100. If an aircraft has a weight of 3,730,000 newtons, which of the following is closest to the thrust, in newtons, of the aircraft?

- A) 1,010,000
- B) 13,800,000
- C) 101,000,000
- D) 373,000,000

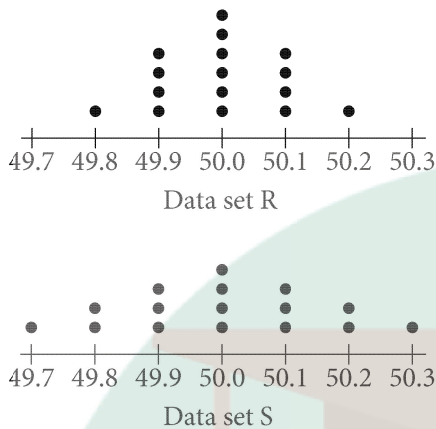
22

The graph of the line $y = -\frac{1}{2}x + 3$ in the xy -plane is translated 2 units to the right. What is the y -intercept of the translated line?

- A) (0, 1)
- B) (0, 2)
- C) (0, 3)
- D) (0, 4)



23

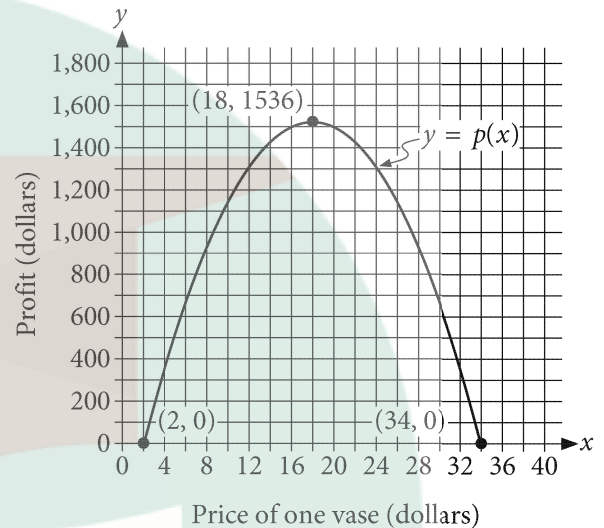


Data set R and data set S are represented in the dot plots shown. The mean for each data set is 50.0. Which of the following best describes the relationship between the standard deviation of data set R and the standard deviation of data set S?

- A) Both data sets have the same standard deviation.
- B) The standard deviation of data set R is greater than the standard deviation of data set S.
- C) The standard deviation of data set R is less than the standard deviation of data set S.
- D) The sum of the standard deviations of the two data sets is 100.

24

A potter is selling vases. The function p gives the total profit $p(x)$, in dollars, the potter will receive if the vases are sold at a price of x dollars each. The graph of $y = p(x)$ is shown.



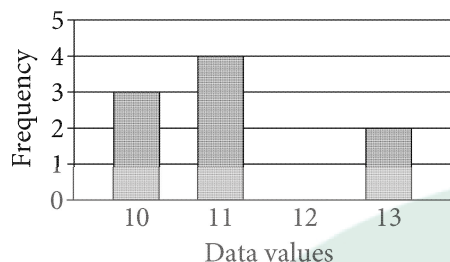
What equation represents the relationship between the price of one vase and the profit?

- A) $p(x) = -6(x - 18)^2 + 34$
- B) $p(x) = -6(x - 18)^2 + 1536$
- C) $p(x) = -6(x - 34)^2 + 18$
- D) $p(x) = -6(x - 34)^2 + 1536$

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25

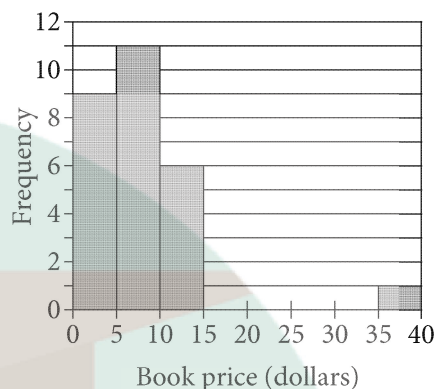


The bar graph shows the frequency of each data value in a certain data set. What is the minimum data value in the data set?

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

26

The histogram shows the distribution of book prices, in dollars, for the 27 books for sale at a store.



The first bar represents books with prices of less than \$5. The second bar represents books with prices of at least \$5 but less than \$10, and so on. In which interval will the median price of books for sale be included when the book that costs at least \$35 but less than \$40 is sold?

- A) At least \$0 but less than \$5
- B) At least \$5 but less than \$10
- C) At least \$10 but less than \$15
- D) At least \$35 but less than \$40

TestDaily



27

$$y = \frac{1}{2}x + 5$$

One of the two equations in a linear system is given. The system has no solution. Which equation could be the second equation in this system?

- A) $y = 2x + 5$
- B) $y = \frac{1}{2}x + 5$
- C) $y = \frac{1}{2}x - 4$
- D) $y = -2x + 5$

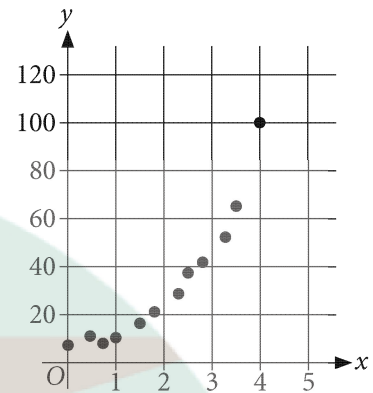
28

$$S(t) = 10(0.5)^{\frac{t}{29}}$$

A sample of strontium-90 will radioactively decay to half the original quantity in approximately 29 years. The function S above models the amount of strontium-90, in grams, that remains t years after a 10-gram sample starts to decay. Which of the following is the best interpretation of the number 0.5 in the function?

- A) The approximate number of years it would take for 5 grams of strontium-90 to remain in the sample
- B) The proportion of strontium-90 that remains after approximately 29 years
- C) The number of grams of strontium-90 in the sample that will decay approximately every 29 years
- D) The number of grams of strontium-90 by which the sample will be reduced each year over approximately 29 years

29



Which equation is the most appropriate exponential model for the data shown in the scatterplot?

- A) $y = \frac{1}{100}(10)^x$
- B) $y = 2(5)^x$
- C) $y = 6(2)^x$
- D) $y = 100(2)^{-x}$

30

$$(x + 3)^2 + (y - 7)^2 = 100$$

In the xy -plane, the graph of the given equation is a circle. Which point (x, y) lies on the circle?

- A) $(3, -4)$
- B) $(3, -1)$
- C) $(3, 1)$
- D) $(3, 4)$



DIRECTIONS

For questions 31-38, solve the problem and enter your answer in the grid, as described below, on the answer sheet.

- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the bubbles accurately. You will receive credit only if the bubbles are filled in correctly.
- Mark no more than one bubble in any column.
- No question has a negative answer.
- Some problems may have more than one correct answer. In such cases, grid only one answer.

- Mixed numbers** such as $3\frac{1}{2}$ must be gridded as 3.5 or $7/2$. (If

3	1	/	2
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

 is entered into the

grid, it will be interpreted as $\frac{31}{2}$, not $3\frac{1}{2}$.)

- Decimal answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid.

Answer: $\frac{7}{12}$ are:

Write answer in boxes. →

7	/	1	2
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Fraction line

Grid in result.

Answer: 2.5

	2	.	5
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Decimal point

Acceptable ways to grid $\frac{2}{3}$ are:

	2	/	3
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

.	6	6	6
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

.	6	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Answer: 201 – either position is correct

	2	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3

2	0	1	
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3

NOTE:

You may start your answers in any column, space permitting. Columns you don't need to use should be left blank.



31

Rectangle A has an area of 64 square meters. The length and width of rectangle B are 3 times the corresponding length and width of rectangle A. What is the area, in square meters, of rectangle B?

32

A one-digit positive integer will be chosen at random. What is the probability that the chosen integer will be greater than 7? (Express your answer as a fraction or decimal, not as a percent.)

33

$$\begin{aligned}5x + 3y &= 31 \\5x - 4y &= 17\end{aligned}$$

If (x, y) is the solution to the given system of equations, what is the value of $10x - y$?

34

The expression $3xy(2y + 3)$ is equivalent to $bxy^2 + 9xy$, where b is a constant. What is the value of b ?

Questions 35 and 36 refer to the following information.

As of 2016, there were 118 known elements. These elements can be described with 10 classifications as summarized in the given table.

Classification	Number of elements
Metalloids	7
Other nonmetals	7
Halogens	6
Noble gases	7
Alkali metals	6
Alkaline earth metals	6
Lanthanides	15
Actinides	15
Transition metals	38
Posttransition metals	11

35

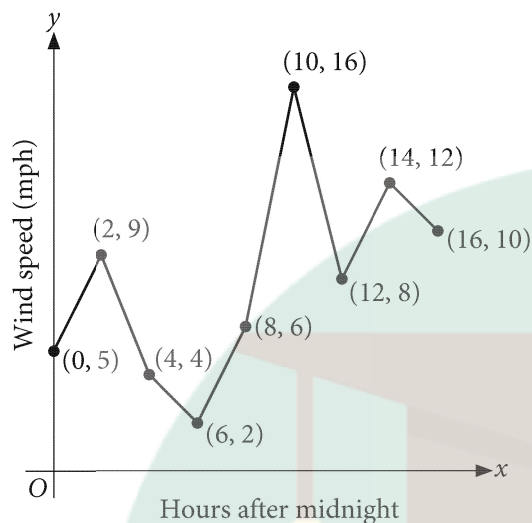
The percentage of the 10 classifications that have 11 or more elements is $p\%$. What is the value of p ?

36

An element is a nonmetal if it is classified as a halogen, noble gas, or other nonmetal. The ratio of all nonmetals to all elements is 10 to k . What is the value of k ?



37



The line graph shows the wind speed recorded every 2 hours in a town, where x is the number of hours after midnight and y is the wind speed, in miles per hour (mph). What is the greatest average change in wind speed, in miles per hour per hour, between two readings shown in the graph?

38

In the xy -plane, line k with equation $y = mx + b$, where m and b are constants, passes through the point $(-3, 1)$. If line k is perpendicular to the line with equation $y = -2x + 3$, what is the value of b ?



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**If you finish before time is called, you may check your work on this section only.
Do not turn to any other section.**